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Thomas E. Anderson
Hunton & Williams LLP
1900 K Street, NW.
Washington, DC 20006-1109

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| EXAMINER |
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TRIMMINGS, JOHN P

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| ART UNIT | PAPER NUMBER |
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2133

DATE MAILED: 08/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/976,170

Applicant(s)

ZERBE ET AL.

Examiner

John P. Trimmings

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-93 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-53, 56-65, 68-78, 81-84, 87-93 is/are rejected.
- 7) ☒ Claim(s) 54, 55, 66, 67, 79, 80, 85, 86 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 6/13/02.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

This office action is in response to the applicant's amendment and RCE dated 7/11/2005.

The applicant amended claims 49, 61, 77, 80-82, 86-88 and 90-93.

Claims 54, 55, 66, 67 and 79 have been previously allowed, but are objected to as being dependent on rejected base claims.

Claims 1-93 are pending in this office action.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/11/2005 has been entered.

Response to Amendment

2. In view of the applicant's changes to Claims 90-93, the examiner withdraws the objections to said claims.

3. Applicant's arguments (see amendment filed 7/11/2005), with respect to the rejection of Claims 90 and 92 have been fully considered and are persuasive. The rejection under 35 USC 112 1st paragraph of Claims 90 and 92 has been withdrawn.

4. Applicant's arguments with respect to claims 1-93 have been considered but are moot in view of the new grounds of rejection (see below).

Claim Rejections - 35 USC § 112

5. Claims 1 and 89 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Both claims compare "the transmit repeating pattern" to the receive repeating pattern, but the claims fail to distinctly state from where the transmit repeating pattern is applied to the compare function. The comparison may be construed as comparing the repeating pattern originating in the transmitter (leaving via driver 115 of FIG.1), or comparing the transmit repeating pattern located on the other side of medium 102 at the input of receiver 116, but neither are associated with the comparator 113. In other words, the applicant fails to accurately claim how the transmit repeating pattern is applied to the comparator 113, because, according to FIG.1 of the Disclosure, the signal being compared at the comparator is a modified transmit repeating pattern signal exiting the receiver. Therefore, the applicant has failed to distinctly claim the compare function.

Claim Rejections - 35 USC § 102

6. Claims 49, 77 and 90 are rejected under 35 U.S.C. 102(e) as being anticipated by Schneider, U.S. Patent No. 6201829.

As per Claim 49:

Schneider teaches a transmit circuit (FIG.5) comprising: a transmit data storage element (FIG.5 50-52 with MUX 35) configured to receive data from a transmit data input (FIG.5 34) to be sequentially transmitted as a transmit data output signal when the transmit circuit is operating in a normal mode (column 7 lines 30-57), the transmit data storage element further configured to provide a repeating pattern signal when the transmit circuit is operating in a test mode (column 8 lines 42-46 and column 9 lines 17-34), the transmit circuit sequentially transmitting the transmit data output signal based on the repeating pattern signal when the transmit circuit is operating in the test mode (column 7 lines 48-57).

As per Claim 77:

Schneider teaches a method for operating a transmit circuit to provide for evaluation of a digital signaling system (FIG.5) comprising the steps of: passing transmit data through the transmit circuit when the transmit circuit is operating in a normal mode (column 7 lines 37-48); and generating a transmit repeating pattern in the transmit circuit when the transmit circuit is operating in a test mode (column 9 lines 17-34 and column 8 lines 42-46)).

As per Claim 90:

Schneider teaches a transmit circuit (FIG.5) comprising; a transmit data storage element (FIG.5 50-52 with MUX 35) configured to receive parallel data from transmit data input (FIG.5 34) and sequentially transmit serial transmit data output signal when the transmit circuit operating in a normal mode (column 7 lines 30-57), the transmit data storage element further configured to provide a repeating pattern signal when the

transmit circuit is operating test mode (column 8 lines 42-46 and column 9 lines 17-34), the transmit circuit sequentially transmitting the serial transmit data output signal based on the repeating pattern signal when the transmit circuit is operating in the test mode (column 7 lines 48-57).

7. Claims 83 and 87 are rejected under 35 U.S.C. 102(b) as being anticipated by Chen et al., U.S. Patent No. 5726991.

As per Claim 83:

Chen et al. teaches a method for operating a receive circuit (FIG.4) to provide for evaluation of a digital signaling system (see Title) comprising the steps of: passing receive data (FIG.4 12) through receive circuit (FIG.4 N-BIT PARALLEL OUTPUTS) when the receive circuit is operating in a normal mode (column 3 lines 65-67, column 4 lines 1-65); and generating receive repeating pattern (FIG.4 36A) in the receive circuit when the receive circuit is operating in test mode (column 3 lines 65-67, column 4 lines 1-65).

As per Claim 87:

Chen et al. further teaches the method of claim 83 further comprising the steps of: transmitting the data to the receive circuit from a transmit circuit (FIG.3 12) when the receive circuit is operating in the normal mode (column 3 lines 65-67, column 4 lines 1-65); and transmitting a transmit repeating pattern to the receive circuit from the transmit circuit (FIG.3 output of 36) when the receive circuit is operating in the test mode (column 3 lines 65-67, column 4 lines 1-65).

Claim Rejections - 35 USC § 103

8. Claims 1, 3, 4 and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847.

As per Claims 1 and 89:

Huysmans et al. teaches a method for evaluating/improving a digital signaling system (see Title) comprising the steps of: generating a transmit repeating pattern in a transmit circuit (FIG.2 PG1/UCG); transmitting the transmit repeating pattern to a receive circuit (FIG.1 U); generating a receive repeating pattern in the receive circuit (FIG.3 SYN/PG2); comparing the transmit repeating pattern to the receive repeating pattern (FIG.3 CMP) to obtain a comparison (FIG.3 O2'), but fails to further disclose adjusting a parameter affecting reception of the transmit repeating pattern at the receive circuit. But in the analogous art of Chao et al., this feature is taught in the Abstract and column 6 lines 11-55, where timing characteristics are adjusted at the receiver to determine operability of an I/O circuit (column 3 lines 38-48). In other words, Chao et al. improves on the testing of a circuit by adjusting timing parameters in order to weed out marginal circuits. And Chao et al., in column 27-63, cites the advantage of a much more accurate test mode for state of the art circuits, as compared to the prior art of testing using an external test system. One with ordinary skill in the art at the time of the invention, motivated as suggested, would have found it obvious to include the timing

test method of Chao et al. in the test system of Huysmans et al. in order to improve circuit testing results.

As per Claims 3 and 4:

Dependent on Claim 1, the parameter adjustments are transmit and receive clocks. Chao et al., adjusts each clock separately (see Fig.5 and column 6 lines 11-55), and in view of the motivation for Claim 1, the claims 3 and 4 are rejected.

9. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Whitworth et al., U.S. Patent No. 6331787. The claim limits Claim 1 to a termination parameter adjustment. Whitworth et al., teaches such an adjustment in column 3 lines 65-67 and column 4 lines 1-33. Also, as described in column 3 lines 58-63, Whitworth et al. cites improved termination of transmission lines thereby. One with ordinary skill in the art at the time of the invention, motivated as suggested by Whitworth et al. to improve signals with low operating voltages, would combine all references to meet these needs, and so the claim is rejected.

10. Claims 5, 14, 15, 16, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Foland et al., U.S. Patent No. 5761212. The claims limit Claim 1 to an input receiver window

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parameter adjustment, done at the receiver. Foland et al., in an analogous art, teaches programmable windows (see Foland et al. Abstract and column 3 lines 30-48) being applied over a range, which then affect optimization of the quality of the channel under test. And in FIG.1, Huysmans et al. teaches the testing to occur within transmission paths (a common medium). And in column 2 lines 61-67, Foland states that channel quality can be continuously monitored and optimized in this invention, and so evaluation occurs at every iteration of the transmit signal. One with ordinary skill in the art at the time of the invention, motivated by Foland et al., would combine the art, and so the claims are rejected.

11. Claims 9, 10, 41 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847, and further in view of Gauthier et al., U.S. Patent No. 5228042.

As per Claim 9:

This claim limits Claim 1 to utilizing a shift register to generate the transmit signal. Gauthier et al., in FIG.1 shows such a register (FIG.1 10). Column 1 lines 60-67 and column 2 lines 1-15 describe the advantage of the invention being a way to test a communications channel by continuously comparing random data across the medium. One with ordinary skill in the art at the time of the invention, motivated as suggested, would have found it obvious to apply the random generator and comparator circuits to

the same testing circuit of Huysmans and Chao et al., in order to provide the continuous data by way of the LFSR of Gauthier et al. at high data rates.

As per Claim 10:

This claim further limits Claim 9 to a linear feedback shift register. Gauthier et al., in the Abstract, describes such a register, and in view of the motivation of Claim 9, this claim is rejected.

As per Claim 41:

The claim, dependent on Claim 1, compares the transmit with the receiver data detecting non-repeatability. Gauthier et al., in FIG.1 shows the circuit that performs this function (FIG.1 60), and in view of the motivation previously stated, the claim is rejected.

As per Claim 46:

Dependent on Claim 1, the claim limits the transmit and receive circuits to being part of the same system. Gauthier et al. teaches this in FIG.1, and in view of the motivation of Claim 1, this claim is rejected.

12. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Sakoda et al., U.S. Patent No. 6230022. The claim limits Claim 1 to output drive level parameter adjustment. Sakoda et al., in an analogous art, teaches improved communication by controlling the power used within the signal being transmitted (column 2 lines 60-67 and column 3 lines 1-60) on a real time basis. In column 2 lines 53-58, Sakoda et al. describes the

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invention as improving on signal quality. One with ordinary skill in the art at the time of the invention, motivated to improve signal quality, would combine the art, and so the claim is rejected.

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of John Brian Terry, U.S. Patent No. 6055297. The claim limits Claim 1 to a crosstalk cancellation parameter adjustment. Terry, in column 3 lines 32-52 describes optimizing a communications system by monitoring crosstalk. In column 2 lines 5-26, Terry describes the advantage of the invention as permitting new and old systems to be installed together. One with ordinary skill in the art at the time of the invention, motivated by Terry, would find it obvious to combine all references in order to improve crosstalk issues, and so the claim is rejected.

14. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Liao et al., U.S. Patent No. 6650698. The claim limits Claim 1 to an equalization parameter adjustment. Liao et al., in the Abstract, describes a system whereby equalization is performed on received data using a feedback coefficient that is constantly being updated. In column 1 lines 30-52, Liao et al. describes the advantage of the invention to be a decrease in errors in a

communications system. One with ordinary skill in the art at the time of the invention, motivated by Liao et al. to improve the error rate in a communication system, would have found it obvious to combine the references, and so the claim is rejected.

15. Claims 11, 31-35, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Maddux et al., U.S. Patent No. 6421801.

As per Claim 11:

The claim limits Claim 1 to transmitting the signal with reference to ground. In an analogous art, Maddux et al., shows that in FIG.4, D_{IN} is the data into the receiver, and the signal is referenced to VSS (ground). Also, advantages to Maddux et al., as described in column 1 lines 10-35, are the capability to control clock timing in order to improve circuit response. One with ordinary skill in the art at the time of the invention, motivated to improve circuit performance, would combine this art with Claim 1, and so the claim is rejected.

As per Claims 31 and 38:

The claims limit Claim 1 to transmitting the signal frequency as a multiple of the receiver frequency. Maddux et al., in column 5 lines 52-65 teaches this, and in the same lines describes the advantage as being easier to measure at the receiver side. One with ordinary skill in the art at the time of the invention, motivated to improve testing of the circuit, would combine the references, and so the claims are rejected.

As per Claim 32:

Dependent on Claim 31, this claim sets the two frequencies to an equal period. This is already taught by Huysmans et al., where the adjustable clocks that drive both circuits may be a common frequency to each circuit (see FIG.2). And in view of the motivation previously stated, this claim is rejected.

As per Claim 33:

Dependent on Claim 31, this claim limits comparing patterns to multiple instances. This is already taught by Huysmans et al. in the Abstract and FIG.1 wherein the testing occurs in a free-running mode, and so continues for an indefinite number of instances. And in view of the motivation previously stated, this claim is rejected.

As per Claim 34:

Dependent on Claim 33, this claim limits adjustment of a parameter in the transmit circuit. This is already taught by Maddux et al., in the Abstract wherein the transmit clock is adjusted. And in view of the motivation previously stated, this claim is rejected.

As per Claim 35:

Dependent on Claim 33, this claim limits adjustment of a parameter in the receive circuit. This is already taught by Chao et al., in Fig.5 wherein the receive clock is adjusted by receive clock align/misalign. And in view of the motivation previously stated, this claim is rejected.

16. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of John S. Prentice, U.S. Patent No. 6674998. The claim limits Claim 1 to transmitting the signal as a differential signal. Prentice, in an analogous art, provides for improved phase error performance (column 2 lines 40-45) in differential signal propagation (column 1 lines 19-24). Therefore, one with ordinary skill in the art at the time of the invention, motivated to improve the signal and error performance, would combine the art of Prentice, and so the claim is rejected.

17. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Semyon Berkovich, U.S. Patent No. 5369755. The claim limits Claim 1 to transmitting the signal as a multi-bit signal (two bits of information on one conductor). In an analogous art, Berkovich provides for multi-bit data to be transmitted (column 2 lines 7-10) using prior art called content induced transaction overlap (column 1 lines 15-67). An advantage, as in column 2 lines 34-35, is data compression, and one with ordinary skill in the art at the time of the invention, motivated to improve data compression, would combine Berkovich with Claim 1, and so this claim is rejected.

18. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and in view of Foland et al., U.S. Patent No. 5761212 as applied to Claim 16 above, and further in view of Philip R. Couch, U.S. Patent No. 4475210. The claim limits Claim 16 to constructing a waveform based on the comparison. A circuit used for the purpose of evaluating signal quality is taught by Couch (column 1 lines 1-8), and presents a waveform for viewing in the form of an "eye-diagram". An advantage to this invention is to predict error rates, according to column 1 lines 25-33. One with ordinary skill in the art at the time of the invention, motivated to provide such a visual aid to predict error rates, would combine the references above, and so the claim is rejected.

19. Claims 20-22, 24-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, in view of Foland et al., U.S. Patent No. 5761212 as applied to Claim 19 above, and further in view of Johnson et al., U.S. Patent No. 6606041. The Claims 20-22 limit Claim 19 to a common medium being a data line, an address line, and a control line. In an analogous art, Johnson et al. uses a recurring (pseudo-random) pattern to drive data, address, and control lines (column 2 lines 61-67, column 3 lines 1-67, column 4 lines 1-62) in a memory test environment, citing an improved calibration result (column 1 lines 5-10). The examiner notes here that Claims 24-26 are dependent on claim 23 but are worded the same as Claims 20-22, and so,

the examiner has taken the liberty to similarly reject Claims 24-26 in view of Claim 23.

As for Claim 27, which is dependent also on the same Claim 23, this claim uses a common medium. And Claims 28-30, based on the same claim, also use the data, address and control lines of Johnson et al. in the optimization of the circuit. One with ordinary skill in the art at the time of the invention, motivated by Johnson et al. to improve calibration results, would combine all references, and so the claim is rejected.

20. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and in view of Foland et al., U.S. Patent No. 5761212 as applied to Claim 18 above, and further in view of Komatsu et al., U.S. Patent No. 6631486. This claim, being dependent on claims 18 and 1, is interpreted by the examiner to mean that one medium is used for data output, and one is used for the repeating pattern. In an analogous art, Komatsu et al. uses such a configuration (see Fig.1 24, and Fig.3 34), and discloses the advantage of being able to test at high frequencies (column 2 line 1-62). Based on the examiner's interpretation of the claim, and although the examiner does not see any reference to this capability in the disclosure, and in view of the motivation and reference of Komatsu et al. to test at high frequencies, the claim is rejected based on combining the references.

21. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No.

6671847 as applied to Claim 1 above, and in view of Maddux et al., U.S. Patent No. 6421801 as applied to Claim 35 above, and further in view of Johnson et al., U.S. Patent No. 6606041. The claims limit the receiving of data by way of a 1st and a 2nd medium. Johnson et al., outlines such an arrangement in FIG.1 and column 4 lines 25-53. And in view of the motivation of Johnson previously noted in Claim 20 above, the claims are rejected.

22. Claims 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Foland et al., U.S. Patent No. 5761212 as applied to Claim 5 above, and further in view of Sakoda et al., U.S. Patent No. 6230022 as applied to Claim 6 above. The claims specify two distinctly differing parameter applications with the objective of evaluating and optimizing signals by comparing at the receiver. Claims 5 and 6 above are examples of a 1st and a 2nd parameter application, and one with ordinary skill in the art at the time of the invention, motivated as outlined in Sakoda et al. and Foland et al., would have found it obvious to combine the two references with Claim 1 as stated above, and so the claims are rejected.

23. Claims 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No.

6671847 as applied to Claims 1 and 41 above, and further in view of Johnson et al.,
U.S. Patent No. 6606041.

As per Claim 42:

Dependent on Claim 41 above, this claim limits the method to optimizing repeatability by adjusting a parameter. Johnson et al. et al. teaches this task in the Abstract, and in view of the motivation for Johnson et al. above, this claim is rejected.

As per Claim 43:

Dependent on Claim 1 above, the claim limits the comparing of transmit to receive to occur at system start up. Johnson et al., in column 1 lines 34-39 teaches this feature, and in view of the previous motivation for Johnson, this claim is rejected.

24. Claims 44, 45, 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Chao et al., U.S. Patent No. 6671847 as applied to Claim 1 above, and further in view of Jalali et al., U.S. Patent No. 6154659.

As per Claim 44:

Dependent on Claim 1 above, the claim limits the comparing of transmit to receive to occur at the time of an error detection. Jalali et al., in the Abstract teaches such a feature, wherein after detecting a failure of signal-to-noise at the receiver, a parameter is passed back to the transmitter in order to adjust power, and in column 5 lines 30-39 recites the advantage of better performance to this feature. One with ordinary skill in the art at the time of the invention, motivated to provide better

performance from a transmitter, would combine the references, and so the claim is rejected.

As per Claim 45:

This claim is similar to Claim 44 in that the occurrence of this type of testing is occasional. The examiner interprets this in that the same initiation of a power adjustment feedback order as in Claim 44 above by the receiver may occur on an occasional basis. In other words, the time between separate requests by the receiver may be minutes, or even hours apart, depending on many variable factors. And, in view of the motivation of Claim 44 above, this claim is rejected.

As per Claims 47 and 48:

Based on Claim 1, these claims limit the transmit and receive units to being located external to each other. In Jalali et al., this is taught also within the Abstract, wherein a receiver senses the need for a change, and requests via the medium, a parameter change in the transmitter, each unit being separated by the medium. In view of the motivation previously given for Jalali et al., the claims are rejected.

25. Claims 50-53, and 56, are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Gauthier et al., U.S. Patent No. 5228042.

As per Claim 50:

Dependent on Claim 49, the storage element is a shift register (Gauthier et al., FIG.1 10), as well as a data latch, and in view of the motivation previously stated, the claim is rejected.

As per Claim 51:

Dependent on Claim 49, when in test mode, the transmit storage element (Gauthier et al., FIG.1 5) provides the repeating pattern (column 3 lines 5-35), and in view of the motivation in Claim 49, the claim is rejected.

As per Claim 52:

Dependent on Claim 49, the repeating pattern of Gauthier et al., at $2^{15}-1$ (column 3 line 67) is much larger than the data capacity of the storage element, which is 10 bits in length (FIG.2 10), and in view of the motivation of Claim 49, the claim is rejected.

As per Claim 53:

Dependent on Claim 49, the transmit storage element stores each data bit (see Gauthier et al., FIG.1 10), and in view of the motivation of Claim 49, the claim is rejected.

As per Claim 56:

Dependent on Claim 49, the transmit storage element is loaded from another source other than data input (see Gauthier et al., column 4 lines 3-13), and in view of the motivation of Claim 49, the claim is rejected.

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26. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, as applied to Claim 49 above, and further in view of the applicant's admitted prior art. This claim limits the transmit circuit wherein the storage element is parallel loaded (see applicant FIG.2 nodes 207, 209, 211, and 213). In view of the motivation previously stated, and based on prior art, the claim is rejected.

27. Claim 58 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, as applied to Claim 49 above, and further in view of Jalali et al., U.S. Patent No. 6154659. Dependent on Claim 49, the transmit circuit receives an adjustment signal from the receiver circuit, and adjusts a parameter (see Jalali et al. Abstract), and in view of the motivation of Jalali et al. previously stated, the claim is rejected.

28. Claim 59 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, and in view of Jalali et al., U.S. Patent No. 6154659 as applied to Claim 58 above, and further in view of Johnson et al., U.S. Patent No. 6606041. Dependent on Claim 58, where the receive circuit is embodied in two memory circuits. Johnson et al., in FIG.1 11a and 11n, defines at least two memory circuits as being receivers of test patterns, and based on the previous motivation of Johnson et al., the claim is rejected.

29. Claim 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, and in view of Jalali et al., U.S. Patent No. 6154659 as applied to Claim 58 above, and in view of Johnson et al., U.S. Patent No. 6606041 as applied to Claim 59 above, and further in view of Wei-Lun Chen, U.S. Patent No. 6003118. Dependent on Claim 59, wherein the transmitter adjusts to a 1st value for the 1st memory, and to a 2nd value for a 2nd memory. In an analogous art, Chen teaches a memory system calibration circuit and method wherein each memory module feeds back in a phase lock loop to the memory controller, where actual adjustment to each clock associated with each memory is made (column 2 lines 40-67 and column 3 lines 1-15). Chen, in column 2 lines 6-20 describes the advantages to the invention based on new and higher clocking frequencies of memory devices. One with ordinary skill in the art at the time of the invention, motivated by Chen, would combine the arts to accommodate higher frequencies, and so the claim is rejected.

30. Claims 61, 91 and 93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881.

As per Claim 61:

Huysmans et al. teaches a receive circuit (FIG.3) comprising; a receive data storage element (FIG.3 ATM-RC, DMUX and PG2) configured to output a receive data output signal (FIG.3 O1') based on a receive data input signal (FIG.3 IN') received at a receive data input when the receive circuit is operating in a normal mode (column 4 lines 31-65), the receive data storage element further configured to provide a repeating

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pattern signal (column 5 lines 57-64) when the receive circuit is operating in a test mode (when an unused cell is available), and; a comparison element (FIG.3 CMP), the comparison element configured to perform a comparison of a relationship between the repeating pattern signal and the receive data input signal received at the receive data input (column 5 lines 57-65) and to produce a comparison output signal (FIG.3 O2') based on the comparison when the receive circuit is operating in the test mode (column 5 lines 65-67). Although Huysmans et al. teaches that the invention does not test the system in a "test" mode, the inventor nevertheless teaches that a test mode may be used to insert the serial repeating data in column 1 lines 34-42 and lines 58-62. And, since the bit-error-rate testing in Huysmans et al. is done during unused cell times, the examiner feels that the claimed limitation, "in a test mode", is met in Huysmans et al., whereby "the BER test mode" (column 2 lines 4-23) is during an unused cell cycle. And in view of the motivation stated for Claim 91, the claim is rejected.

As per Claim 91:

Huysmans et al. teaches a transmit circuit (FIG.2) comprising: a transmit data storage element (FIG.2 ATM-TC, MUX, column 4 lines 21-23) configured to receive serial data from a transmit data input (column 4 lines 14-17) and sequentially transmit a serial transmit data output signal (column 4 lines 12-23) when the transmit circuit is operating in normal mode (column 4 lines 46-65), the transmit data storage element further configured to provide a repeating pattern signal (column 5 lines 21-35) when the transmit circuit is operating in a test mode (when an unused cell is available), the transmit circuit sequentially transmitting the serial transmit data output signal based on

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the repeating pattern signal when the transmit circuit is operating the test mode (column 4 lines 24-30). Although Huysmans et al. teaches that the invention does not test the system in a "test" mode, the inventor nevertheless teaches that a test mode may be used to insert the serial repeating data in column 1 lines 34-42 and lines 58-62. And, since the bit-error-rate testing in Huysmans et al. is done during unused cell times, the examiner feels that the claimed limitation, "in a test mode", is met in Huysmans et al., whereby "the BER test mode" (column 2 lines 4-23) is during an unused cell cycle. Motivation for Huysmans et al. is found in column 1 lines 58-62, where there is a savings of time during BER test because of the internal test capability of the invention. Therefore, one with ordinary skill in the art at the time of the invention, motivated as suggested, would have found it obvious to apply the testing of a circuit in a test cycle in which an unused cycle was available in order to conserve overall bandwidth.

As per Claim 93:

Huysmans et al. teaches a receive circuit (FIG.3) comprising: a receive data storage element (FIG.3 ATM-TC, DMUX, PG2) configured to output a serial receive data output signal based on a serial receive data input signal (FIG.3 IN') received at a receive data input when the receive circuit is operating in a normal mode (column 4 lines 31-65), the receive data storage element further configured to provide a repeating pattern signal (column 5 lines 57-64) when the receive circuit is operating in a test mode (when an unused cell is available), and; a comparison element (FIG.3 CMP), the comparison element configured to perform a comparison relationship between the repeating pattern signal and the serial receive data input signal received at the receive

data input (column 5 lines 57-65) and to produce a comparison output signal (FIG.3 O2') based on the comparison when the receive circuit is operating in the test mode (column 5 lines 65-67). Although Huysmans et al. teaches that the invention does not test the system in a "test" mode, the inventor nevertheless teaches that a test mode may be used to insert the serial repeating data in column 1 lines 34-42 and lines 58-62. And, since the bit-error-rate testing in Huysmans et al. is done during unused cell times, the examiner feels that the claimed limitation, "in a test mode", is met in Huysmans et al., whereby "the BER test mode" (column 2 lines 4-23) is during an unused cell cycle. And in view of the motivation previously stated, the claim is rejected.

31. Claims 62-65, 68 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Gauthier et al., U.S. Patent No. 5228042.

As per Claim 62:

Dependent on Claim 61, the storage element is a shift register (Gauthier et al., FIG.1 51), as well as a data latch, and in view of the motivation of Claim 61, this claim is rejected.

As per Claim 63:

Dependent on Claim 49, when in test mode, the transmit storage element (Gauthier et al., FIG.1 51) provides the repeating pattern (column 3 lines 36-65), and in view of the motivation in Claim 61, the claim is rejected.

As per Claim 64:

Dependent on Claim 49, the repeating pattern of Gauthier et al., at $2^{15} - 1$ (column 3 line 67) is much larger than the data capacity of the storage element, which is 10 bits in length (FIG.2 51), and in view of the motivation of Claim 61, the claim is rejected.

As per Claim 65:

Dependent on Claim 61, the receive storage element stores each data bit (see Gauthier et al., FIG.1 51), and in view of the motivation of Claim 61, the claim is rejected.

As per Claim 68:

Dependent on Claim 61, the transmit storage element is loaded from another source other than data input (see Gauthier et al., column 4 lines 3-13), and in view of the motivation of Claim 61, the claim is rejected.

As per Claim 70:

Dependent on Claim 61, the comparison element (Gauthier et al. FIG.1 60) detects variation between the received patten (FIG.1 22) and the repeating pattern (FIG.1 58), and in view of the motivation of Claim 61, the claim is rejected.

32. Claim 69 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881 as applied to Claim 61 above, and further in view of Johnson et al., U.S. Patent No. 6606041. Dependent on Claim 61, the claim limits the receive circuit to being loaded via a parallel receive input (Johnson et al.,

FIG.2 61, 49, 47), and in view of the motivation of Johnson previously stated, the claim is rejected.

33. Claims 71-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Gauthier et al., U.S. Patent No. 5228042, as applied to Claim 70, and further in view of Maddux et al., U.S. Patent No. 6421801.

As per Claim 71:

The claim limits Claim 70 to transmitting the signal frequency as a multiple of the receiver frequency. Maddux et al., in column 5 lines 52-65 teaches this, and in the same lines describes the advantage as being easier to measure at the receiver side. One with ordinary skill in the art at the time of the invention, motivated to improve testing of the circuit, would combine the references, and so the claims are rejected.

As per Claim 72:

Dependent on Claim 71, this claim sets the two frequencies to an equal period. This is already taught by Gauthier et al. in FIG.1 18 wherein the clock that drives both LFSRs is a common clock to each. And in view of the motivation previously stated, this claim is rejected.

As per Claim 73:

Dependent on Claim 71, this claim limits comparing patterns to multiple instances. This is already taught by Gauthier et al. in the Abstract wherein the testing

occurs in a free-running mode, and so continues for an indefinite number of instances.

And in view of the motivation previously stated, this claim is rejected.

As per Claim 74:

Dependent on Claim 73, this claim limits communicating comparison output back to the source (transmitter). This is already taught by Maddux et al. in the Abstract wherein the testing occurs and the receiver feeds back error results to the transmitter. And in view of the motivation previously stated, this claim is rejected.

34. Claims 75 and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huysmans et al., U.S. Patent No. 6693881, in view of Gauthier et al., U.S. Patent No. 5228042, as applied to Claim 70, and in view of Maddux et al., U.S. Patent No. 6421801 as applied to Claim 73 above, and further in view of Johnson et al., U.S. Patent No. 6606041. Dependent on Claim 73, both claims limit that wherein the receiver adjusts a parameter affecting its reception of the receive data based on the comparison (see column 1 lines 33-67), and since the same parameter adjustment affects the other memories (same reference), a second receive data signal from a second memory will be affected by the same parameter adjustment. And so, based on the previous motivation for Johnson, both claims are rejected.

35. Claims 78 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schneider, U.S. Patent No. 6201829 as applied to Claim 77, and in view of Gauthier et al., U.S. Patent No. 5228042.

As per Claim 78:

Gauthier further teaches the method of claim 77 wherein the step of generating a transmit repeating pattern in the transmit circuit further comprises the step of: preloading an initialization pattern into the transmit circuit (see FIG.1 32 and column 4 lines 3-13). And in view of the motivation for Gauthier et al., previously stated, the claim is rejected.

As per Claim 81:

Schneider further teaches the method of claim 77 further comprising the steps of: receiving the data in a receive circuit when the transmit circuit is operating in the normal mode (FIG.5 MUX 55); and receiving the transmit repeating pattern in the receive circuit when the transmit circuit is operating in the test mode (FIG.5 MUX 35). And in view of the motivation previously stated, the claim is rejected.

36. Claim 82 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schneider, U.S. Patent No. 6201829 as applied to claim 77, and further in view of the applicant's admitted obviousness of the claim on page 6 of the Remarks in amendment dated 5/17/2004. The applicant further discloses the method of claim 77 further comprising the steps of: receiving the data in a receive circuit when the transmit circuit is operating in the normal mode; and receiving the transmit repeating pattern in a test receiver separate from the receive circuit when the transmit circuit is operating in the test mode, wherein the applicant alleges that one with ordinary skill would realize that two receivers may be used. This obvious modification is admitted in the referenced

statement made by the applicant, and so, in view of the motivation for Schneider stated earlier, the claim is rejected.

37. Claim 84 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., U.S. Patent No. 5726991, in view of Gauthier et al., U.S. Patent No. 5228042. Gauthier et al. further teaches the method of claim 83 wherein the step of generating a receive repeating pattern in the receive circuit further comprises the step of: preloading an initialization pattern into the receive circuit.

38. Claim 88 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., U.S. Patent No. 5726991, as applied to claim 83, and further in view of the applicant's admitted obviousness of the claim on page 6 of the Remarks in amendment dated 5/17/2004. The applicant further discloses the method of claim 83 further comprising the steps of: transmitting the receive data from a transmit circuit when the receive circuit is in normal mode, and transmitting a repeating pattern from another separate transmitter when in test mode in the said Remarks, wherein the applicant alleges that one with ordinary skill would realize that two transmitters may be used. This obvious modification is admitted in the referenced statement made by the applicant, and so, in view of the motivation for Chen et al. stated earlier, the claim is rejected.

39. Claim 92 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., U.S. Patent No. 5726991. Chen et al. teaches a receive circuit (FIG. 4) comprising:

a receive data storage element FIG.4 44, 52, 54) configured to output parallel receive data output signal (FIG.4 N output of 52) based on a serial receive data input signal received at a receive data input (FIG.4 12) when the receive circuit is operating in a normal mode (column 3 lines 65-67, column 4 lines 1-65), the receive data storage element further configured to provide a repeating pattern signal when the receive circuit is operating in a test mode (column 3 lines 65-67, column 4 lines 1-65), and; a comparison element (FIG.4 62), the comparison element configured to perform a comparison of a relationship between the repeating pattern signal and the serial receive data input signal received at the receive data input and to produce a comparison output signal based on the comparison when the receive circuit is operating in the test mode (column 5 lines 7-15). The examiner has selected the units 44, 52 and 54 in FIG.4 to comprise the receive data storage element as being sufficient to satisfy the broad nature of the limitation, "a receive data storage element" in the claim. And the inventor, in column 1 lines 28-45 cites the advantage of a parallel BER testing system for serial data transmission systems, which eliminates the need for expensive external equipment and removal of the device. One with ordinary skill in the art at the time of the invention, motivated as suggested, would have found it obvious to utilize the parallel PRG measurement system of Chen et al. in the testing of a circuit in order to eliminate costly equipment and to maintain attachment of the device while under test.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the

unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

40. Claims 1, 6, 7, 8, 9, 10, 11, 12 and 13 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 9-10, 11, 11, 11, 12, 13, 14, 15 and 16 respectively of U.S. Patent No. 6873939. Although the conflicting claims are not identical, they are not patentably distinct from each other because all claim limitations describe the same method, but claims 9 and 10 of the patent are combined to be patentably consistent with claim 1 of the application.

41. Claim 89 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 9-10 respectively of U.S. Patent No. 6873939. Although the conflicting claims are not identical, they are not patentably distinct from each other because all claim limitations describe the same method, but claims 9 and 10 of the patent are combined to be patentably consistent with claim 89 of the application. Also, since the method steps are identical, and the preamble is not associated with the the difference between the preambles is ignored

Allowable Subject Matter

42. Claims 80, 85 and 86 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As per Claim 80:

Claim 80 is dependent on objected Claim 79, and is therefore allowable for the same reasons as stated for Claim 79 by the examiner in the previous office action dated 3/9/2005.

As per Claim 85:

The following is a statement of reasons for the indication of allowable subject matter in regard to Claim 85: All of the prior art of record cited in the previous office actions failed to further teach or disclose uniting a plurality of pipeline structures within the receive circuit into a receive repeating pattern generator when the receive circuit is operating in the test mode.

As per Claim 86:

Claim 86 is dependent on objected Claim 85, and is therefore allowable for the same reasons as stated for Claim 85 by the examiner.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John P. Trimmings whose telephone number is (571)

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272-3830. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

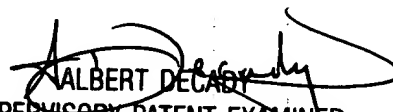
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John P Trimmings
Examiner
Art Unit 2133

jpt



ALBERT DECADY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100